

Shubha Sankar Banerjee

Curriculum Vitae

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EDUCATION

- 2022-Present **PhD in Statistics**, University of Pittsburgh, Pittsburgh, USA.
Advisor: Dr. Zhao Ren
- 2022 **M.Sc. in Statistics**, Indian Institute of Technology Kanpur, Kanpur, India.
Grade: 9.5/10 (Class Rank: 1)
- 2020 **B.Sc. (Honors) in Statistics**, St. Xavier's College, Kolkata, India.
Grade: 8.2/10

RESEARCH INTERESTS

High Dimensional Statistics, Non-Asymptotic Analysis, Differential Privacy, Bayesian Analysis, Statistical Computing.

PUBLICATIONS

- 1 **Banerjee, S.S.**, Mitra, A., Mondal, R. (2024) Asymptotic Analysis of Regression Quantile Estimators for Real-Valued Chirp Signal Model. *Circuits, Systems, Signal Processing* **43**, 1053–1100. ([link](#))
- 2 Theis, N., Bahuguna, J., Rubin, J.E., **Banerjee, S.S.**, Muldoon, B. and Prasad, K.M. (2025) Energy of Functional Brain States Correlates With Cognition in Adolescent-Onset Schizophrenia and Healthy Persons. *Human Brain Mapping* **46**: e70129. ([link](#))

In Preparation

- 1 Mondal, R., Mitra, A., **Banerjee, S.S.** (2024+) Asymptotic Properties of Least Absolute Deviation Estimators of 2-Dimensional Chirp Signal Model.
- 3 Ruan, H., **Banerjee, S.S.**, Makki, M., Leu, P., Iyengar, S. (2025+) An Efficient Data-driven Early Warning for Thermal Runaway in Lithium-ion Batteries.
- 4 **Banerjee, S.S.***, Ruan, H.*, Iyengar, S. (2025+) Sample Size Calculation for Mediation with R^2 effect size.

RESEARCH EXPERIENCE

- 2023+ **Doctoral Student**
Advisor: Dr. Zhao Ren, University of Pittsburgh
- Finite Sample performance analysis of dimension reduction techniques and graphical model estimation and inference in High-dimensional Differential Privacy regimes.
 - Gaussian Graphical Models on longitudinal data. Collaborator: Dr. Rachel Vaughn-Coaxum, Dept. Psychiatry, Pitt.
- 2024 **Graduate Student Researcher**
Mentor: Dr. Satish Iyengar, University of Pittsburgh
- Enhancing Battery Degradation Analysis and Thermal Runaway Prediction.
 - Project funded by Center for Materials Data Science for Reliability and Degradation (MDS-Rely).
- Sum'23 **Graduate Student Researcher**
Advisor: Dr. Satish Iyengar, University of Pittsburgh
- Development of methods and R package for power analysis for mediation models with confounding variables.
- 2021-22 **Estimation and model selection for non-stationary and non-linear sinusoidal models with non-constant frequencies.**
Advisor: Dr. Amit Mitra, IIT Kanpur
- Studied consistency and asymptotic normality of robust non-linear chirp signal models with extended model selection analyses for multi-component sinusoidal signals.

TEACHING & CONSULTING

Teaching Fellow

- STAT 1000- Applied Statistical Methods

F'23

Teaching Assistant

- STAT 1100- Statistics and Probability for Business Management

F'22, S'23

Grader

- STAT 2730/1731- Stochastic Processes
- STAT 1000- Applied Statistical Methods

S'23

S'24

2024 Statistics Consultant

- Provided statistical consultation to researchers working in Schools of Social Work and Health at Pitt and Department of Pediatrics, UPMC.

TALKS & CONFERENCES

- 1 “Simulated Power Calculations for Mediation Effects with Covariates”, Poster, *Keystone State Statistics Symposium*, Pennsylvania State University, Oct 7-8, 2023.
- 2 Talk titled: “Power Analysis for Mediation Models: Methods & Results”, Department of Psychiatry, University of Pittsburgh, Nov 9, 2023.
- 3 *MDS-Rely Spring meeting*, Carnegie Mellon University, Apr 16-17, 2024.
- 4 “Thermal Runaway in Batteries- Analysis & Prediction”, Poster and Talk, *MDS-Rely Fall meeting*, Case Western Reserve University, Cleveland, Aug 26-28, 2024.
- 5 “A Data-driven Early Warning for Battery Thermal Runaway”, Poster and Talk, *MDS-Rely Spring meeting*, University of Pittsburgh, Apr 8, 2025.

Journal Referee

Statistica Sinica

RELEVANT COURSEWORK

- Graduate Level
- **Theory:** Probability and Measure theory, Theory of Statistics, Multiple Hypothesis Testing, Asymptotic Methods in Statistics, Time Series, Robust Statistical Analysis, Multivariate Analysis, Decision Theory, High-dimensional Statistics.
 - **Methods:** Linear Models, Applied Statistical Methods, Applied Bayesian Analysis, Statistical Simulation and Data Analysis, Survival Analysis.
- Undergrad level
- **Statistics:** Measure Theory, Regression Analysis, Statistical Inference, Bayesian Analysis, Sampling Theory, Stochastic Processes, Econometrics, Non-parametric Statistics.
 - **Mathematics:** Real Analysis, Matrix Theory and Linear Estimation, Linear Algebra, Differential Equations, Integral Calculus, Multivariate Calculus, Complex Analysis.
 - **Programming:** Data Analysis using R, C programming, Data analysis using Minitab, Computer programming and data structures.

ACADEMIC ACHIEVEMENTS

- 2023, 2025 University of Pittsburgh Dietrich School of Arts & Sciences Summer Fellowship.
- 2022 General Proficiency Medal, *for best academic performance among graduating M.Sc. Statistics students.*
- 2020 Secured All India Rank **45** in Joint Admission Test for Masters among 3473 candidates.
- 2018-20 Fr. Lafont Scholarship for Academic Performance, St. Xavier's College.
- 2017-22 *INSPIRE* Scholarship for Higher Education, Department of Science and Technology, Government of India for duration of Bachelors and Masters.
- 2017 Top 1% (aggregate marks) of CISCE board Class XII examination among 73,633 students in India.

LANGUAGE AND TECHNICAL SKILLS

Language: English, Bengali, Hindi.

Programming Languages: R, Python, C, C++, Matlab.

Software: R Studio, Minitab, MS-Excel, L^AT_EX.

Professional Memberships

Institute of Mathematical Statistics (IMS); American Statistical Association (ASA); International Indian Statistical Association (IISA)

Other Activities

- 2025 Business Manager, Bengali Students Organization, University of Pittsburgh.
- 2024-25 Student Representative of Department of Statistics, Pitt at ASA Pittsburgh Chapter.
- 2024-25 Business Manager, *ANKUR*, Indian Graduate Students Association, University of Pittsburgh.
- 2024 *Chair* for Poster Session, *Keystone State Statistics Symposium*, Pitt.
- 2020 Organizing Committee Member of *Epsilon Delta'20*, Convenor of *Proectura'20* and Editorial Board Member of *Prokarsho'20*, the annual seminar, paper presentation event and the annual magazine respectively of Dept. Statistics, St. Xavier's College, Kolkata.
- 2017-20 Volunteered to teach children in villages as a member of *National Service Scheme*, India.